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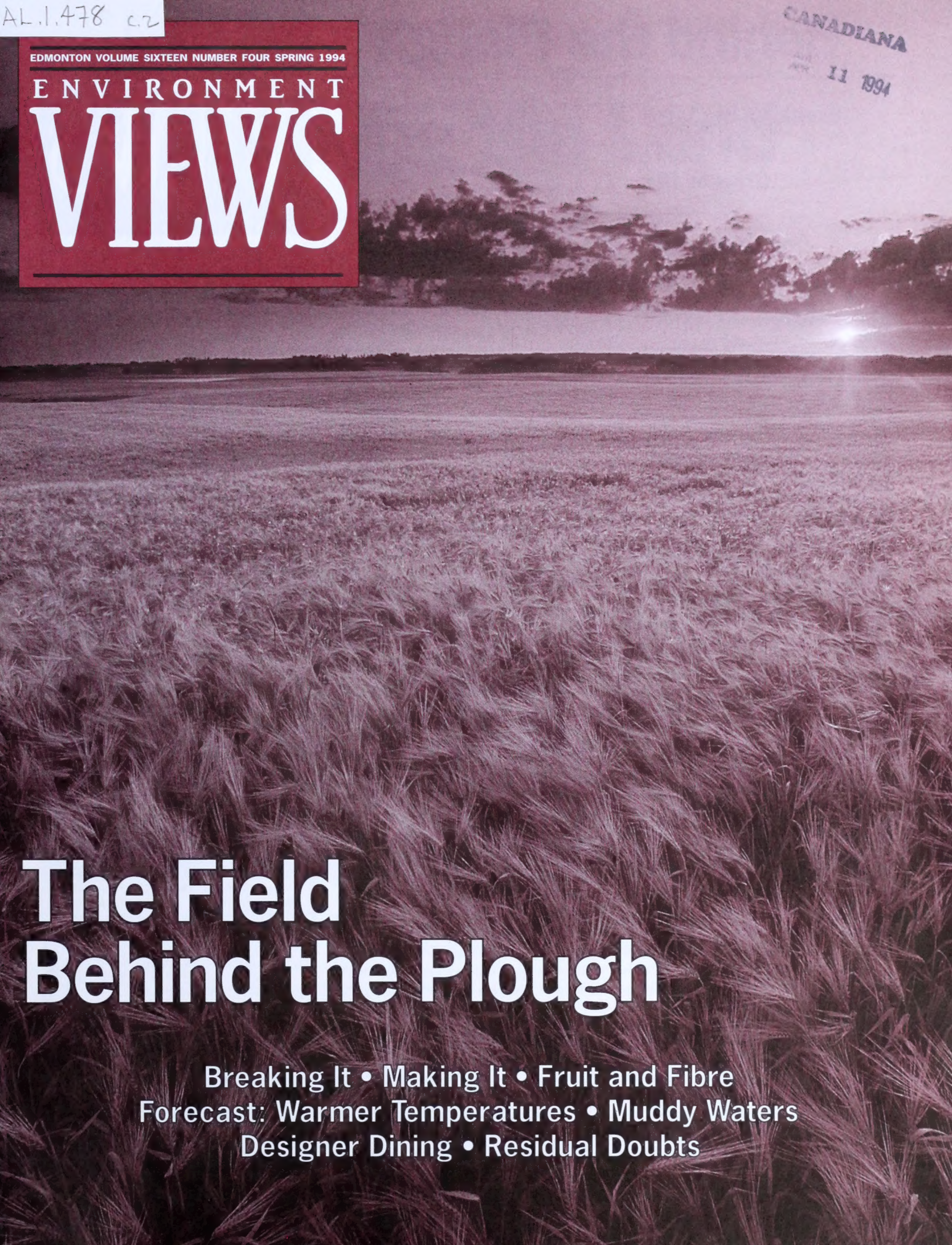
ENVIRONMENT VIEWS



The Field Behind the Plough

Breaking It • Making It • Fruit and Fibre
Forecast: Warmer Temperatures • Muddy Waters
Designer Dining • Residual Doubts

Behind the Plough

Breaking the Land 3 **And putting it back together.** by Marilyn Florence

Grow or Die 7 **Is the family farm sustainable?** by Bill Corbett

Mr. Vegetable 10 **A jack of all trades reinvents the mixed farm.** by Bruno Wiskel

Hello, Nebraska 12 **Warmer climes are moving up.** by Eric Bailey

Trickle Down 15 **Off the land and into the water.** by Alf Cryderman

Brave New Food 17 **Coming soon to a grocery store near you.** by David Bates and Lynn Zwicky

Swallow Hard 20 **Should you worry about chemicals in your food?** by Lee Hart

EDITOR'S NOTEBOOK

No one who makes his living from agriculture would argue that soil depletion or over-dependence on the market price of a single commodity is a good thing. Nor would any farmer argue that high productivity is a bad thing. But there seem to be at least two reasonable approaches to reconciling sustainability with the need to earn a living: you can "tune up" modern agriculture with improved techniques, inputs and marketing, or you can return to the roots of farming.

The tune-up approach sees the future of farming in high yields and export markets. It looks to better genes and improved farm machinery to keep productivity high while reducing problems such as soil erosion and chemical residues. In Marilyn Florence's article, for example, Cam Hancock describes the risk to his farm from soil erosion. He always leaves the stubble on his fields and depends on herbicides, rather than cultivation, to control weeds. Genetic engineering may soon produce crops able to better withstand herbicides, which could encourage more farmers to follow Hancock's zero-till strategy to conserving soil. Bill Corbett's article describes Clinton Steinley as a thoroughly modern farmer who plants his six sections with a $50,000 seeder and has diversified into unconventional crops including a new variety of wheat in demand for making noodles along the Pacific Rim.

At the other end of the spectrum, Bruno Wiskel looks for markets closer to home and at the particular features of his farm for guidance on what to grow. He has turned his small operation near Athabasca into a U-pick market garden and U-fish trout pond, with a woodlot on the side—more like the mixed farm of his grandfather than his father's grain farm on which he grew up.

Whatever the path, change will come: new trade agreements, climate change, growing concerns about health and chemical residues will see to that. And one goal is clear: our agricultural lands have to produce food—and that means they have to support farmers—for as long as we last. Not for five hundred or a thousand years, unless you're willing to say that should be the run of humans on earth. Forever.

Lynn Zwicky is an Edmonton writer and researcher who specializes in environmental issues.

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ENVIRONMENT
VIEWS

Environment Views is published quarterly by Alberta Environmental Protection. Each issue deals with a specific topic from various viewpoints with the aim of increasing awareness of environmental issues among Albertans. *Environment Views* is directed by an independent board with representation from environmental groups, government and industry. The views expressed by the publication are not necessarily those of Alberta Environmental Protection.

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Alberta
ENVIRONMENTAL PROTECTION

Marilyn Florence

Breaking the Land

And putting it back together.

Soil drift in southern Alberta.

ALBERTA AGRICULTURE, FOOD AND RURAL DEVELOPMENT

In the early 1980s, Cam Hancock became convinced that conventional farming degraded the land.

"I watched with concern as one particularly severe windstorm uncovered a ridge of stones in a nearby cultivated field that before the storm had appeared free of stones," says Hancock, who farms near Marwayne in east-central Alberta.

The blowing land had once formed part of Alberta's parkland ecoregion and supported an integrated community of wild plants and animals. Now, it risked becoming of no use for anything.

Two Solitudes

The cultivation of fragile areas, exposed soils and the destruction of marshes and bluffs have all contributed to the degradation of Alberta's agricultural lands.

Many organizations such as the Prairie Farm Rehabilitation Administration (PFRA), Ducks Unlimited, the Alberta Cattle Commission and Alberta Fish and Wildlife have stepped in to reduce the erosion of ecosystems and of the soil.

But Ed Tyrchniewicz, dean of the University of Alberta's Faculty of Agriculture, Forestry and Home Economics, says these programs treat the symptoms rather than the disease. The root of the problem is agricultural policy that fails to grasp the big picture.

"We have tended to tackle problems on an ad hoc rather than a systemic basis," he says, "and, as a result, we have often come up with essentially 'band-aid' solutions.

"More and more, governments are looking at the consequences of policy, but unfortunately this is more of an afterthought in the whole process. An assessment of environmental implications should be done in the planning stages.

"We have often just given lip service to the ecological implications of a policy. I call this the solitude of the economist and the solitude of the ecologist."

Last year, the Alberta Water Resources Commission took a great stride forward in bringing together economists, ecologists, agronomists and others to produce their wetland management policy. According to environment officials, the policy aims to co-ordinate the work of government departments to stem the loss of wetlands in settled areas of Alberta.

Still, for many farm groups, agriculture policy has yet to break the two solitudes that Tyrchniewicz describes. Alanna Koch, executive director of the Western Canadian Wheat Growers Association, contends that this situation has caused farmers to receive mixed messages for years.

"One government policy will encourage us to increase cultivated acreage, regardless of the land's suitability, while another will encourage us to take land out of production," she explains.

"A case in point is the Canadian Wheat Board's quota delivery system."

Since the 1930s, the Canadian Wheat Board (CWB) has been the sole agency for marketing wheat and barley grown in western Canada for human consumption. When the board wants grain delivered to market, it sets a quota on how many tonnes per hectare it will buy. The system gives every farmer access to markets, but it also pushes marginal land into production. Good land can usually grow more than the CWB quota, so farmers cultivate marginal land to increase the total tonnes of grain they can deliver.

"The way quotas work, the more land a farmer has to assign, the more grain he can deliver for sale," says Koch. "The result is that farmers are encouraged to increase their quota base by cropping marginal and unsuitable lands. We have asked that grain delivery opportunities in western Canada be based on contracts—amount of grain in the bin—rather than acreage.

"This is just one example of the government's inconsistency," says Koch, "and it's one reason why we continue to ask policy makers to consider the overall implications of the programs they put in place."

JAY DEE MEDIA

Barley harvest, Cremona.

Just the Facts on Farming

Area of prime agricultural land in Alberta: 10.7 million hectares.[1]

Area of marginal land: 9.3 million hectares.[1]

Total area cultivated, 1991: 12.8 million hectares.[2]

Easily degraded soil under cultivation, 1987: 3.6 million hectares.
  - prime land: 2 million hectares.
  - marginal land: 1.6 million hectares.[3]

Area of marginal land retired from cultivation under PFRA's permanent cover program, 1989-1993: 220,708 hectares.[3]

Estimated cost of soil degradation to Alberta farmers, 1985: $429 million.

Farm spending on fertilizers, 1991: between $250 and $300 million.[4]

Percentage of Alberta farmers reporting low-till or no-till farming practices to conserve soil, 1991: 14.[2]

Percentage of farms reporting use of fertilizers, 1971: 37.
  - 1991: 58.[2]

Percentage of farms reporting use of pesticides and fungicides, 1971: 3.5.
  - 1991: 6.7.[2]

Largest single source of loss of Alberta's prime agricultural land: urban annexation.[4]

Prime land lost to urban annexation, 1976-1990: 64,500 hectares.[4]

Estimated loss of wetlands in Alberta's settled area since 1900: 63%.
  - estimated percentage of loss due to agriculture: 70.[5]

Percentage of North America's waterfowl that uses Alberta wetlands: 20.[6]

Percentage decline in mallard population since 1955: 40.
  - In pintail population: 88.[6]

Wetland conserved in Alberta by Ducks Unlimited and the North American Waterfowl Management Program as of 1993: 652,650 hectares.
  - upland habitat conserved: 65,010 hectares.[6]

Estimated rate of wetland depletion in Alberta now: 0.5% per year.[5]

Natural habitat retained on private land through Alberta's Landowner Habitat Program: about 16,000 hectares.[5]

Sources:

[1] Environment Canada
[2] Statistics Canada
[3] Prairie Farm Rehabilitation Administration
[4] Alberta Agriculture, Food and Rural Development
[5] Alberta Environmental Protection
[6] Ducks Unlimited

> **"We have tended to tackle problems on an ad hoc rather than a systemic basis and we have often come up with essentially 'band-aid' solutions. We have often just given lip service to the ecological implications of a policy."**

Kathryn Olson of Earthkeeping, formerly the Christian Farmers Federation, agrees that policy makers must consider environmental outcomes. "We support policy that encourages a balanced view of sustainability and advocates diversified land use—for instance, the coexistence of agriculture and wildlife.

"We believe policy must work to ensure that land is maintained for its best use. Prime agricultural land that is lost to urban development can never be reclaimed. It is gone forever. Earthkeeping is also concerned with cuts to municipalities. If transfers of funds from the province are greatly reduced, municipalities will have to look elsewhere for funds, and that would affect conservation efforts both directly and indirectly."

Russ Evans, executive manager of the Alberta Conservation Tillage Society, says his organization has asked governments to pay attention to soil conservation when they set policies. Evans says programs such as PFRA's Permanent Cover Program have done a great deal to further soil conservation on sensitive lands. The program pays farmers to remove marginal, erosion-prone land from cultivation and put it into forage and livestock production.

Do Not Disturb

Russ Evans says, if you want to keep your topsoil, you want "minimum soil disturbance with maximum crop residue." The low-till wide-blade cultivator slices through soil one inch below the surface. It leaves stubble on the ground to protect soil from blowing, but cuts off weeds at the root.

Zero-till farmers use no cultivation to control weeds and depend entirely on herbicides. "With zero-till, you knife in your seed and fertilizer," says Evans, executive manager of Alberta's Conservation Tillage Society. "We're not saying that's necessarily the way it has to be done. We think there may be a need for one cutoff with a low profile cultivator for weed control. Generally, that will eliminate one herbicide application."

Evans says sustainable farming is more than soil management. "The Conservation Tillage Society has been primarily focused on grain farming, but we are broadening that out all the time.

"We need more market-driven production. Diversification also gives us the opportunity to control weeds with fewer herbicides or different herbicides."

DARYL BENSON

Exposed to erosion: a tilled field near Rimbey.

Yet, while he acknowledges the value of individual programs, Evans also looks at the entire system. "There may be a need for some short-term incentives, but what we really want to see are well-co-ordinated, well-formulated long-term policies."

Harry Hill, director general of PFRA in Regina, warns of the pragmatic problems in achieving all-encompassing policy.

"It is very difficult and time-consuming to get everyone together and to make sure everyone understands the effects of a change," he explains. "That's not to say these goals aren't worth pursuing; it's simply acknowledging that in the past we have often adjusted our spending patterns to deal with problems that needed immediate attention.

"We must tackle the resultant layering or 'stovepiping' of policies and programs," concludes Hill.

Conservation Carrots

Ed Tyrchniewicz says, "Farmers agree with the principles of conservation, but they also quite rightly ask 'Why am I supposed to do this for society and not get paid for it?'

"If we accept that prohibitions don't work, we are left to ask how we go about compensating farmers for good environmental practices. We can't just give them exhortations to do good. At the same time, we must be careful to design programs so we don't create a farming-for-subsidies situation. And the programs must also be transparent to both participants and taxpayers.

"The financial restraints we live with will likely preclude a government cheque in the mail," says Tyrchniewicz. "We will have to explore alternatives to direct transfer payments. Tax credits may be one possibility."

Brian Colgan of Alberta Agriculture, Food and Rural Development agrees funding for direct transfer programs is scarce. He doesn't

continued on page 6

"Farmers agree with the principles of conservation, but they also quite rightly ask 'Why am I supposed to do this for society and not get paid for it?'"

DUCKS UNLIMITED

Geese stage for migration in southern Alberta.

continued from page 5

necessarily see tax credits, however, as a workable alternative. Colgan suggests policy should encourage farmers to look at changing the way they use the land and the products they produce.

"Why can't we talk about opportunities for livestock or legumes or forage?" asks Colgan. "The price of cereals is low, while the economics of livestock production, for instance, are very attractive.

"If we take this tack, we won't be paying someone to do something; we'll be saying here's a market opportunity that will allow you to generate perhaps more net income while at the same time doing something good for your land."

The Big Challenge

Ed Tyrchniewicz believes the greatest challenge for government and industry will be to set policy that is economically, technologically, environmentally and politically workable. He draws special attention to political feasibility.

"The farm population is decreasing and so is the number of Canadians who have a direct tie to the farm," he says. "Given the perception that grain farming is so heavily dependent on government handouts, I would say we will have an increasingly tough sell in the years to come. To win political and public support, we must work to convey the message that agriculture is growing ever more environmentally sensitive."

But, says Harry Hill, we can't turn back the clock. "We must work to achieve managed states that are sustainable in the present context, not in terms of the prairie landscape and ecosystem as they existed 100 years ago. We must deal with today's reality and that is that we will produce food on a continual basis, many times using cultivation."

For prairie farmers, the greatest challenge will be finding a way to farm that offers the best results in both economic and ecological terms. Eight years ago, Cam Hancock adopted a system of zero-till on his farm and, in terms of conservation, economics and general good stewardship, it fills the bill for him.

Says Hancock, "This is a personal commitment and it will involve rethinking and perhaps even substantial changes. That's why farmers must look for the best alternatives to help them fulfil this commitment. They have to consider their individual needs and look for a system that will work for them on their farms."

Marilyn Florence is a writer who lives near Viking and specializes in agricultural issues.

Wild in Private

Since 1978, the Landowner Habitat Program has paid farmers to leave undisturbed natural habitat on their land. The program, funded through a levy on hunting and fishing licences under the Buck for Wildlife program, pays landowners the assessed tax on their undisturbed land, or some percentage of its assessed value each year.

"Farmers like the program," says Elmer Kure, retired Innisfail farmer and founder of the program. "If you're not going to get a nickel out of a piece of land, you either clear it or pasture it. Failing another option, that's what happens. The Landowner Habitat Program helps farmers to do what they know is right.

"It's the only way we're going to preserve wild habitat on private land. If we leave it to the marketplace, we'll continue to plough it under and grow cattle and wheat."

Kure says the program spends $100,000 a year to protect habitat in the central parkland ecoregion, "the most threatened ecoregion in the province." Another $200,000 goes to the Bow and Eastern Irrigation District to protect habitat created by leaky irrigation canals that better water management threatened to eliminate.

Kure says the program has no more money to expand, although many more farmers in Alberta could use it.

Bill Corbett

Grow or Die

Is the family farm sustainable?

GEORGE WEBBER

Farmhouse near Rowley.

The family farm remains the hub of agriculture across the Canadian prairies. But growing pressures continue to claim its weaker members.

"We still have a successful mum and dad type of operation," says Clinton Steinley, 36, who farms with his brother Aaron near Empress along the Alberta-Saskatchewan border. "There have been a few casualties, but that's normal in any business. A lot of video and corner stores go out of business, too."

Already battered by a decade of depressed grain prices, the family farm faces freer global trade, more diversified markets and an ongoing exodus of sons and daughters to the city.

Diversification, adaptability and bigger, more efficient farms will single out the survivors, say many farm analysts.

A Change for the Bigger

The Steinley farm is typical of these changes. It's big and heavily invested in non-traditional crops. Last year, the Steinleys grew seven crops including miniature sunflowers, peas, lentils and canary seed. They tried a new variety of wheat popular in Pacific Rim countries for making noodles and unleavened bread. "We don't just plough, plant and haul to the elevator any more," says Steinley. "We keep an ear to the ground and try to find out what is going to be hot."

The Steinleys also see the large size of their farm as crucial to their survival. They own six sections or 1,550 hectares.

"The implement we plant the crop with is a $50,000 machine. You have to do a lot of hectares to make it worthwhile," says Clinton. "To farm one section of land, you still have to have the same equipment you would use for two sections."

Between 1971 and 1981, the average Alberta farm grew from 320 to 348 hectares, an increase of nine per cent. Inflation, easy financing and outside investment encouraged farmers to risk bigger operations where they could. As well, fewer family members stayed around to inherit their parents' land.

"There used to be a tradition of parents looking after all their kids," says Ralph Ashmead, president of Ashmead Economics, an agricultural consulting firm in Calgary. "But when they tried to maintain that concept in the early 1970s, it proved unworkable. There were just too many people. Now, a lot of kids are not that excited about staying on the farm anyway." Parents pass on the farm to one child, instead of dividing it among three or four.

The growth in farm size slowed in the 1980s. Depressed grain prices forced many family farms into liquidation, but few investors or surviving farmers wanted to sink money into more land. By 1991, the average Alberta farm had grown an additional 4.3 per cent to 364 hectares. Since 1971, the number of farms in Alberta fell from nearly 63,000 to 58,000 in 1981 and to 57,000 in 1991.

The Bread Line

Some analysts believe subsidies have kept smaller, inefficient operators in business. Others say production-based subsidies have encouraged larger farms.

"It is pretty well accepted that agricultural supports favour farm consolidation because they reduce the risk of making the investments that lead to larger enterprises," says Peter Apedaile, a professor of agricultural economics at the University of Alberta.

In Canada, he says, the government's ad hoc approach to grain subsidies has created a climate of uncertainty and kept farm sizes smaller than they might have been. In the U.S. for example, where government support programs are more systematic, farms are generally larger.

Fewer Hands Make Light Work

Technology and competition will likely drive the trend to bigger farms in future.

"It's probably going to take larger, more efficient farms to be successful in a freer market. I think a lot of farms held together by subsidies will have to increase their size to lower their unit costs or else sell out."

"Farms are going to get bigger as things become more mechanized," says Steinley. "Each farmer can produce more and is able to handle more hectares. That's not politics. That's just advancement."

In the cattle business, for example, those big, round hay bales save labour because farmers make fewer winter trips to feed their cattle. Mechanization rules dairy, chicken and hog farms, where computerized feeding systems allow relatively few people to run sizable operations.

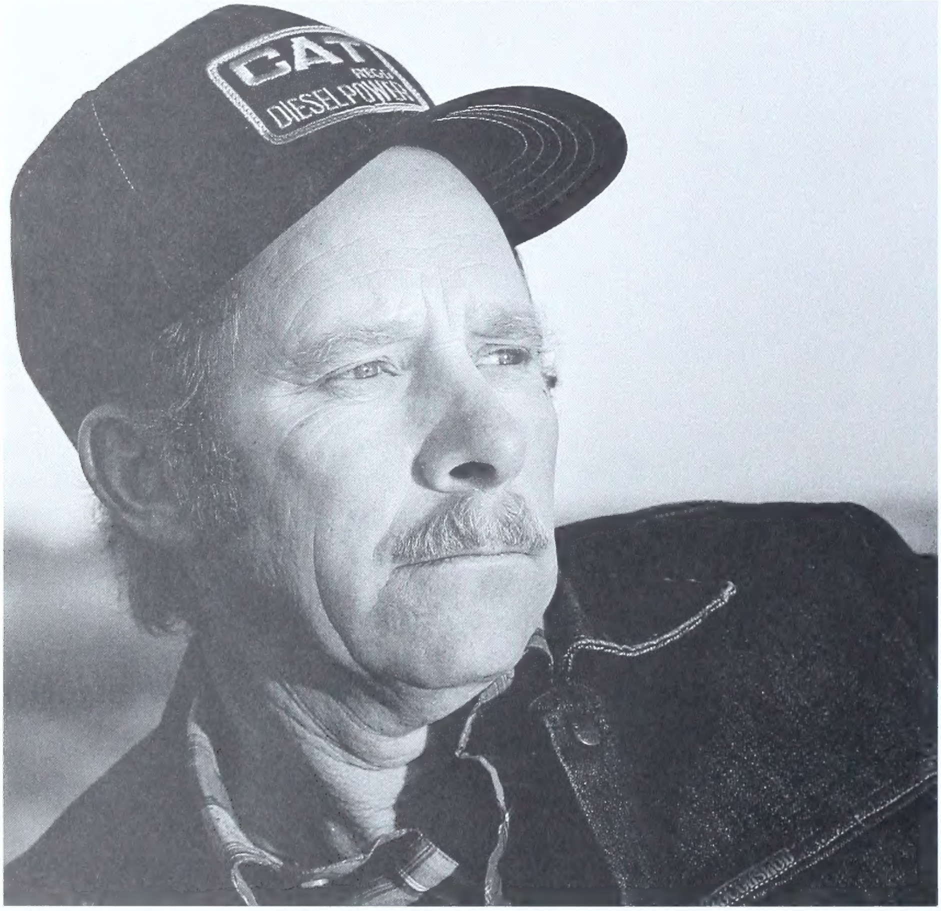
Compete or Kaput

Politics, too, will change the equation. The North American Free Trade Agreement (NAFTA) and the recent deal on the General Agreement on Tariffs and Trade (GATT) should all contribute to more international competition for agricultural products.

"The stalemate over GATT kept people from making changes for seven to eight years," says Ashmead.

"The GATT deal may well lead to an accelerated rate of structural change and adjustment. It's probably going to take larger, more efficient farms to be successful in a freer market. I think a lot of farms held together by subsidies will have to increase their size to lower their unit costs or else sell out."

Already, says Apedaile, most successful grain farms generate about $150,000 to $250,000 in gross annual sales. "You don't do that on 400 seeded hectares," he says. "The average Alberta farm (about 364 hectares) is not big enough any more. On average, the pure grain farm in Alberta will have to increase its seeded area by 10 to 12 hectares a year to keep up with technology and maintain a standard of living from agriculture."



Earl, a Calgary-area farmer.

MARK MENNIE

The Stretch to Stay

Most Alberta farm families maintain a semblance of their former standard of living only by working off the farm. In many cases, one or both spouses have part- or full-time jobs in nearby cities and towns.

"I work totally off the farm," says Karen Chase, who in partnership with her daughter owns a gourmet food and western wear business in Calgary. Her husband, Ron, runs Chase Cattle Company, a purebred cattle operation south of Calgary.

"I used to help him, but I don't any more," she says. "The economic reality is a lot of men and women have to work off the farm."

Juggling several jobs adds to the already considerable stresses of keeping a family farm going. "Farming never used to be as stressful as it is now," says Florence Trautman, project co-ordinator of the Unifarm Hope Line, a phone counselling service that began operating in Alberta in late 1993. "There seems to be pressure to get bigger and diversify. As the pressures build, the family starts breaking down too."

Trautman says there are often communication breakdowns between generations, especially when a son wants to change the farm.

Off-farm jobs have become a permanent reality on many family farms. In the future, they could provide a more stable and diversified income base from which to either expand an operation or make a smaller farm viable.

But Peter Apedaile calls off-farm work a slippery slope, a transition phase before getting out of farming completely.

"We saw this earlier in the U.S.," he says. "For most farm households, it's a disengagement strategy over a decade or two."

Apedaile gives an example of a 50-year-old farmer with a 20-year-old son. The son leaves the farm to work in town or on oil rigs, with plans to return to the family farm within 10 years. In many cases, the son never returns. Even if he does, it may be too late.

"If that household doesn't expand and modernize during that decade, it will be too far behind to catch up, and the farm will likely be liquidated and recombined," says Apedaile.

"In the decade ahead, you'll see a much greater need for household farms to make the decision to become dynamic, commercial enterprises."

"The average Alberta farm is not big enough any more. In the decade ahead, you'll see a much greater need for household farms to make the decision to become dynamic, commercial enterprises."

The Harvest of Change

In future, groups of farmers may form syndicates to raise cattle. Or they may pool their capital, pull in outside investment and build a feed mill to process their own raw grains.

"The family farm may still be at the hub, but it would have strategic partners in these ventures," says Ralph Ashmead.

"They could be financed by a milling, marketing or international company. A lot of companies overseas are interested in locking in supplies of, say, hay. Farmers may find they need to create partnerships with those kinds of people."

The corporate conglomerate, however, may not replace the family farm. Clay Gilson, a professor of agricultural economics at the University of Manitoba, says the future rural economy may consist of a mix of large farms and smaller, more diversified operations supported by off-farm income.

As well, big farms are efficient only up to a point. Clinton Steinley says he's not in the market for more land. He would rather diversify production on the land he has.

Len Bauer, a professor of agricultural economics at the University of Alberta observes, "It seems farmers still need to keep an individual eye on the biological process. Farming is not something that lends itself to a factory type of operation. So relatively small-scale operations still seem to be economically viable.

"That seems to be the most efficient way. I think that's why the family farm has persisted."

Bill Corbett is a freelance writer from Calgary.

MARK MENNIE

Ralph from Manyberries.

Sizing Up the Competition

The new General Agreement on Tariffs and Trade (GATT) could have a significant impact on Alberta farmers. But it's too soon to predict the long-term effects on the family farm.

Egg, chicken and dairy producers will feel the effects most directly. Until now, they have relied on marketing boards to set quotas to restrict imports and control supply and prices for their products. Under the new GATT deal struck last December, Canada agreed to give up marketing boards. For now, we can use tariffs to protect our supply-managed industries, but we must phase them out over the next six years.

"The concern, I suspect, is whether in Canada we will be able to retain some form of supply management internally," says Clay Gilson, professor of agricultural economics at the University of Manitoba.

"The federal minister of agriculture says yes, but it depends on the co-operation of the provinces."

Dairy and poultry farmers worry about how they will cope with American competition. In the long run, the new deal will allow huge U.S. farms to sell their products in Canada at very low prices.

Grain farmers generally embrace the GATT deal. It should end the subsidy war between Europe and the U.S. and bring higher international grain prices.

"Anytime you get more liberalized trade, it's great for grain producers," says Clinton Steinley, a farmer near Empress, Alberta. "That's what governments should be doing—securing access to markets. We'll do the rest."

At the same time, GATT will disallow many Canadian farm subsidies as trade-distorting. If we want to keep them, we will need to redesign them.

"There will probably be a smaller subsidy and I hope one that is income-based rather than linked to price and production. If that occurs, the producer will make decisions based on market conditions," says Darcy Willis, a senior trade policy analyst with Alberta Agriculture. Of course, continued government budget cuts could also slash farm subsidy programs.

Cattle businesses have for some time enjoyed the benefits of free trade. Alberta producers have profited from the low Canadian dollar and the freedom to move live cattle between Canada and the U.S. Ironically, the beef boom may suffer under the new GATT if it drives up the price of feed grains.

Bill Corbett

Bruno Wiskel

Mr. Vegetable

A jack of all trades reinvents the mixed farm.

Aside from occasional obligatory visits to my grandparents' cattle ranch, I never had much to do with farming. This all changed in 1975 when my father took over the farm after my grandfather's death.

With my father at the helm, the character of the farm changed dramatically, from a mixed farm to a straight grain operation.

Cereal grains ruled the prairies in the mid-seventies and my father, like most other Canadian farmers, took the view that if the land could grow a worthless tree, it could grow a profitable grain crop. Grain prices soared to record highs. The Canadian Wheat Board, district agriculturists, even bank managers, pushed grain production.

Farmers invested in "efficiencies": big machinery, farm chemicals and flat, dry land. They bulldozed woodlots into piles and burned them. They drained marshes. They ploughed everything that could be ploughed, and seeded it to grain.

In the early eighties, the bubble burst. Grain prices plummeted. Faced with herbicide resistance and soil erosion, small landowners could no longer make a living from traditional crops. Many small farmers sold out and moved to the city.

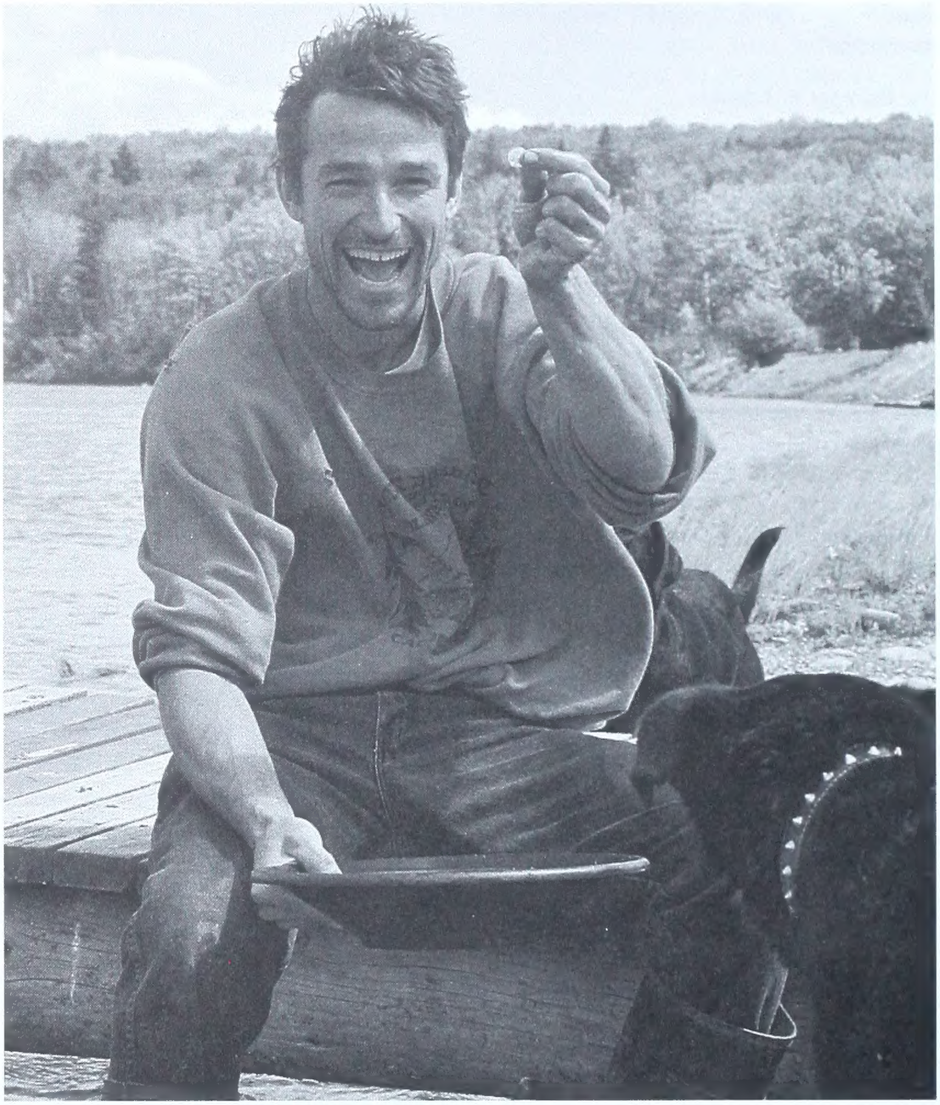
The farms that remained, though larger and striving for big efficiencies, were not always a financial success. High interest rates and oversupplied markets crushed the viability out of many farm businesses. Farm work could not pay off the debts needed to finance bigger operations and bigger machines.

One Small Solution

I have been a farmer for eight years now and I look at efficiency differently. My farm is small. It sells everything from vegetables to wood and raspberries to fish. My input costs are low, and so is my rate of soil erosion. I get a little income from the farm year-round, which I supplement with freelance writing and geological consulting.

My farm reflects my belief that we need a radically new way of thinking about and using the land. I have tailored my plans to fit my farm, rather than changing the farm to fit a plan. This is "holistic management": it integrates a diversity of farm products into a single operation according to the talents of the farmer and what the land supports best.

Mr. Vegetable, my farm's trade name, lies just east of the hamlet of Colinton near Athabasca. It has a market garden, an orchard, a U-fish trout pond and a woodlot, as well as more traditional endeavours such as alfalfa



ATHABASCA ADVOCATE

Bruno Wiskel: living off the land.

We need a radically new way of thinking about and using the land. I have tailored my plans to fit my farm, rather than changing the farm to fit a plan.

I am not just selling groceries: I am selling a lifestyle. The market garden and U-fish customers take a mini-vacation every time they come to buy my products. They want to experience a simpler time, when things moved at a slower pace.

and timothy seed production. When I bought the farm, however, it only had potential.

I bought it in 1986 when low oil prices killed my corporate job as an exploration geologist. My severance package was enough to put a down payment on a half-section of land.

I justified buying the farm very easily. I couldn't touch the same size house in Edmonton or Calgary for the same money, and the farmhouse came with a 130-hectare backyard.

That backyard had a number of features suited to diversification. It straddled a wide east-west valley with mature trees. The sheltered, south-facing slope of the valley created a microclimate with a frost-free period two to three weeks longer than the surrounding area. The soil was very black, rated number two, which meant it was good for growing a wide variety of non-traditional crops.

The farm also had a half-hectare dugout, a byproduct of local construction, which the previous owners had written off and used as a garbage pit. The water table in the adjacent aquifer kept the dugout full. The pond's water level varied less than 10 centimetres from one year to the next.

A good network of roads capped the package: a paved secondary highway to the north and a gravel secondary highway on the east.

The farm came from conventional roots. Big rented machines had harvested traditional grain crops such as wheat, barley and canola from its land. This had eaten into the profitability of the farm and into its soil.

The bulk of expenses had consisted of fertilizer, herbicide and custom machine work. When combined with low commodity prices, the farm made virtually no money after the mortgage was paid.

Raising grain had another financial disadvantage: no continuous cash flow. Traditional grain farming requires a massive outlay of cash in the spring for planting, but brings no guarantee that the Canadian Wheat Board will find markets for the crops in the fall.

To make way for grain, previous owners had stripped the trees from the steep northern boundary of the farm and the soil showed signs of wind and water erosion.

For me, the solution to these problems lay in one simple truth: the natural features of a farm give the farm its value. Once I took that to heart, it made the job of diversifying the products of the farm much easier.

Everything Has Value

First I planted the erodible areas of the farm, such as hillsides and wind-exposed soils, to forage crops so I wouldn't have to work the land every year.

Next, I began a massive tree-planting program of several hundred spruce for shelterbelts. I also planted 110 apple trees and 600 saskatoon bushes to control wind erosion, and to add beauty to the farm. The fruit trees, along with six 100-metre rows of raspberries, became the nucleus of Mr. Vegetable's U-pick orchard.

I cleaned up the dugout so I could use it to irrigate the fruit and vegetable crops and to raise trout. I also use it for boating, swimming and windsurfing.

I stocked rainbow trout in the pond, at first just for my own recreation. But the project grew into an unanticipated sideline. I was one of a handful of people who stocked rainbow trout in my area. When I went for my fish, I began to haul trout for others and charged a small transportation fee. From these small beginnings, I built a business as a rainbow trout broker, buying and selling trout for recreational pond stocking. The equipment to transport and hold the fish cost less than $200 and the business generated enough income to cover the cost of planting my market garden.

I eventually opened my pond as a U-fish. The idea went hand-in-hand with the market garden. Entire families come to pick produce at Mr. Vegetable, but not everyone stays keen to the task. Some family members, usually the men, retire to the trout pond. The combination keeps everybody happy, which gives me higher sales and repeat business.

But the trout pond is more than a fall-back activity for the garden-weary. It brings in customers all on its own. Fishing is the number one participation sport in Canada, so traffic to the market garden increased when I opened the pond for fishing.

The pond is also a great place to relax after a hard day's work, and provides a refuge for nesting birds and a place for wildlife to drink.

The combination of the trout pond and the market garden gives me a positive cash flow through most of the summer. Just when the

Pumpkins

fish sales peter out around the middle of June, the market garden starts to kick into production. First come the strawberries, then the early vegetables and the raspberries and saskatoons in July, and finally, in August, the late season vegetables such as cucumber.

A Way of Life

My market garden started as a hectare of pickling cucumbers. Over the years, it has grown to 12 hectares and, after several experiments, produces around 10 varieties of the most profitable vegetables.

But Mr. Vegetable's market garden does more than grow the right kind of produce. I am not just selling groceries: I am selling a lifestyle. The market garden and U-fish customers take a mini-vacation every time they come to buy my products. They want to experience a simpler time, when things moved at a slower pace.

I try to give my customers some of those old-time farm experiences. I grind grain right before their eyes. The children can wander through a petting zoo of farm animals.

Everything is connected, of course. The petting zoo animals eat all the vegetable tops and damaged produce, and I spread their manure back on the garden. I graze the sheep in reforested parts of the farm's 40-hectare forest to keep the vegetation down around newly planted trees.

The market garden tractor, which would otherwise sit idle in winter, hauls logs and powers a sawmill. I use the wood I cut to build fences, corrals and sheds in the market garden. What I don't saw into boards, I sell as firewood.

When the weather is too cold for logging, I can always look for work as a writer or geologist. I can live in the country and maintain contact with my urban colleagues by phone, fax and home computer.

The transformation of my farm from a traditional grain operation into Mr. Vegetable took some thought and some time. I believe what I'm doing holds great promise for revitalizing rural areas. Mr. Vegetable is labour-intensive. I usually hire upward of four people during the summer to maintain it, which means Mr. Vegetable employs one person per three hectares. If the rest of Canada's farmland supported this job ratio, we could eliminate unemployment and rural depopulation.

More importantly, I have a lifestyle that I am proud to hand down to future generations.

Bruno Wiskel farms near Colinton and is author of Pond Raising Rainbow Trout.

Eric Bailey

Hello, Nebraska

Warmer climes are moving up.

ALBERTA AGRICULTURE, FOOD AND RURAL DEVELOPMENT

A cornhusker near Brooks.

Everybody talks about the weather but nobody does anything about it. It's a familiar refrain on the farm. But in the past five years, farm talk has turned more and more to concerns about long-term climate change and the conviction that this time, somebody has to do something.

Teams of climatologists, agricultural scientists and economists have started to study the effects of approaching global climate change on agriculture in Alberta and across the Canadian prairies. The universities of Lethbridge, Calgary and British Columbia, the Alberta and Saskatchewan research councils, and the federal and provincial departments of agriculture all have work in progress to predict the effects of climate change on Alberta farms.

The news, so far, is good and bad. Droughts in southern Alberta will get worse, and we will see more severe weather and more unpredictable weather. But economists advise there's no reason to panic about the gradual increase in temperatures and changes in

> **"A four-degree summer rise and a six-degree winter rise would give us a climate much like Nebraska today."**

precipitation that climate change will bring over the next few decades. Authors of a report sponsored by the Government of British Columbia and the University of British Columbia, conclude that "Prairie agribusiness need not fear an insidious greenhouse effect." Farming will benefit from a longer growing season, a bigger area of viable cropland and more crop options. At worst, they say, agriculture could suffer losses due to drought, but the advantages of farming in a warmer climate might offset the risks.

A Change in the Weather

Farmers worry most about temperature, precipitation and the length and timing of the growing season. Scientists now predict increases in prairie temperatures varying from 3.3°C in June and July to 6.3°C in December and January within the next 50 years.

Annual precipitation may increase by about 18 per cent but much of that will come in the spring resulting in an increase of perhaps only five per cent during the growing season. The growing season may lengthen by an average of 48 days.

"A four-degree summer rise and a six-degree winter rise would give us a climate much like Nebraska today," says David Major, crop physiologist at Agriculture Canada's research station in Lethbridge.

"Maybe we will get a warmer, cloudier, wetter winter and a drier, hotter summer. There's also a good possibility we'll look more like Nevada than Nebraska. There has even been some conjecture that the Mojave Desert might move southwest of Winnipeg."

Dust to Dust

The spectre of drought sends a shudder through most southern Albertans. In future, southern Alberta will become even more drought-prone. Droughts will be more frequent, severe and long-lasting. Frequency could increase by a factor of three to 10. Serious droughts will happen twice as often as they do now.

Some Alberta crops already need more water than falls naturally and we meet this deficit with irrigation. Water deficits in the dry southeast part of Alberta, known as the Palliser Triangle, could be worse than in the dry years of the 1930s. This could break up what is now continuous grassland and degrade semiarid grassland into scrub desert.

We can't increase irrigation indefinitely to meet future water deficits. That would place more pressure on water delivery systems, creating demand for more storage and diversion facilities. Studies of the 1988 drought in the south suggest that in a warmer climate, streamflows could fall to less than 50 per cent of present values. Increased agricultural irrigation and urban water demands will likely lead to conflicts among water users.

> **"We have to look at all these changes as opportunities. We're underpopulated and overproducing wheat. Climate change gives us the chance to diversify into some other crops."**

Scientists express concern about soil erosion in a warmer climate in all agricultural regions of Alberta.

In areas that get enough rain, water erosion may get worse. As carbon dioxide levels increase, plants will transpire less and may use less water. This could result in greater runoff and more erosion.

DARYL BENSON

A storm over stubble near Edmonton.

Even in drier climates, erosion may increase as the volume of snowmelt, and the number and intensity of spring rainstorms, increases. Wind erosion may increase if droughts become more frequent and intense. Warmer temperatures will also promote faster decomposition of soil components which, along with increased erosion, will lead to decreases in organic matter. Organic matter makes soil fertile and helps bind it together.

Many of these problems conjure up images of the dust bowl of the '30s—events we know can be avoided with improved vegetation cover and management.

A Plague of Locusts

If growing conditions improve for many crops as Alberta's climate changes, we can be sure crop pests will benefit as well. Locusts, aphids and moths, for example, become more active as temperature or humidity rises. A warmer climate will allow diseases and pests now stuck in the south to move north. Not only will longer growing seasons give pests more time to multiply, creating bigger infestations, farmers may have to fight two life cycles of an insect in a growing season rather than one.

Go North, Young Man

Climate change will heavily stress the south, but northern Alberta will experience even greater effects.

In higher latitudes, warmer temperatures will permit farming in new regions that have suitable soils but, so far, unsuitable climates. Farmers will be able to switch to more valuable varieties of food crops that need a longer

"We perceive weather and we don't perceive climate. This can be quite dangerous."

growing season. Many northern farmers will be able to choose wheat over canola.

More Forecasts

Atmospheric change will affect agriculture in more complex ways, too. Ozone depletion and increased ultraviolet radiation may lead to health problems for farmers and livestock as well as decreases in crop yields.

On the other hand, most plants will benefit from increased carbon dioxide, a plant nutrient. Some plants will even become more drought-tolerant, because they use water more efficiently in a carbon-dioxide-rich environment. Among crops, cereals such as wheat and rice will experience major improvements while corn will respond only slightly. Most weeds will get a shot in the arm as well.

While rising temperatures will add to the growing season, the variability of increased temperatures will certainly bring record heat waves, particularly in late summer. Other extreme climatic events such as freezes and floods may become more common and more severe.

Bracing for the Storm

According to agricultural researchers, Alberta farmers can expect a long-term reduction in yields of spring-sown crops by six to 28 per cent. Right now, spring wheat dominates cereal crops on the prairies. It covers more land and fills more granaries than any other crop. In 1987, it contributed $2.33 billion to the prairie economy. Scientists say that as climate change progresses, spring wheat farmers will face increasingly frequent bad crop years and immense financial strain.

David Major prefers to look for the silver lining even if the cloud doesn't produce much rain. "We have to look at all these changes as opportunities. We're underpopulated and overproducing wheat. Climate change gives us the chance to diversify into some other crops.

"The southwest United States might experience serious water shortages in future. Beef is a big water consumer. Alberta has already taken advantage of that opportunity to export beef to the U.S. We should look at crops, such as beef and canola, that will help us become the protein and oil source for the Pacific."

As a rule of thumb, the longer the growing season a crop variety needs, the higher the yield and the higher the financial return. As our growing season lengthens, farmers may switch to varieties that can take advantage of the longer season. They may pass up spring wheat, canola and lentils for more attractive

Wild Plants Track Climate Change for Farmers

Climate controls the timing of such crucial farm tasks as seeding, fertilizing and pest control. Missing by even a week can reduce crop yields significantly. But if climate keeps changing, how can farmers hope to keep in step?

"You can start by turning the calendar to the wall," suggests Strathmore-area farmer Gordon Hilton.

Hilton, an award-winning zero-till practitioner, tells time by natural events around his 1,450-hectare farm. For example, once the maples bud and soil temperature reaches 4°C, he begins seeding barley.

Over the past eight years, Hilton has begun seeding as early as April 7 and as late as April 25, yet some of his neighbours still go by the calendar—starting to seed May 10 just as dad and granddad did. By starting early, farmers harvest earlier and work more land with the same labour and machinery resources.

Watching nature for clues to the timing of farm routines doesn't have to stop with seeding, according to Elisabeth Beaubien, the co-ordinator of the wildflower flowering date survey for the University of Alberta.

Since 1987, about 200 volunteers across the province have recorded flowering phases for 15 species of wild plants from crocuses to poplars. Though new to western Canada, observer networks are well-established in Europe and the U.S. The German network consists of 3,000 observers feeding information to the state agriculture department.

Beaubien would like to match the Alberta findings with information on the phases of crops, weeds and insects. "I would like to be able to say that five days after plant x blooms is the best time to control insect y."

She can envisage a rapid reporting network to alert farmers through radio broadcasts of the best times for weed and pest control. Because climate varies so much from one locality to another, cues from wild plants will keep farmers in step with local climate conditions even as they change from year to year.

Eric Bailey

DEREK JOHNSON

When yellow bean blooms, Elizabeth Beaubien says you should start sowing your lettuce, peas, sweet peas and hardy flowers such as pansies. Yellow bean grows in southern Alberta and ranges as far north as Edmonton. To the Blackfoot Indians, the blooming of the bean signalled when to hunt bison bulls. By the time it flowered, the bulls had recouped their weight after the lean Alberta winter.

alternatives: winter wheat, soybeans, corn, sunflowers, flax and sorghum.

"A warmer, wetter winter would definitely favour winter wheat. It gives you a two- to three-week advantage for a quicker start in spring and beats the summer drought," says Major. "But you could still plant your regular crop earlier. We haven't seen winter wheat proliferate in the south yet.

"It's possible that corn could increase with a four-degree increase in summer temperatures but a switch like that requires a considerable investment in equipment."

To adapt to the changing climate, farmers may turn to more livestock production. You can move livestock to follow the best pastures. You can feed and water them, if necessary, where they are. In addition, some forage crops will cope better with the new climate than traditional food crops. Livestock, however, need sufficient water of good quality, an increasingly critical constraint especially for southern Alberta farmers. Climate change will pose other problems for livestock producers: changes in forage crops, expanding geographical ranges of tropical parasites, reduced conception rates and increased early embryo death.

What farmers will do to prepare for the onslaught of the new climate will depend on the information they possess, the faith they put in that information and their ability to adapt.

Several research groups in western Canada are studying decision-making processes in agriculture. Elaine Wheaton, a climatologist with the Saskatchewan Research Centre, notes that farmers base short-term decisions, such as when to seed and when to harvest, on weather rather than climate.

"Long-term decisions that affect land quality, erosion, rotations, types of crops or livestock should be based on climate knowledge," says Wheaton. "Yet we perceive weather and we don't perceive climate. This can be quite dangerous. The climate can warm up without us knowing about it. We go on planning for the future based on past experience."

She says farmers will have to be prepared for a wide range of futures. "Strategies that reduce climate and weather risk, and increase soil and moisture retention, will work best. Many things related to sustainable agriculture work well for drought—zero tillage, for example.

"Diversification is important during times of uncertainty. Don't put all your eggs in one basket."

Eric Bailey is a freelance writer who lives near Lacombe.

Alf Cryderman

Trickle Down

Off the land and into the water.

ALBERTA AGRICULTURE FOOD AND RURAL DEVELOPMENT

Research links livestock to some water quality problems in Alberta.

By August, the water lapping Bill Wearmouth's beach is thick with blue-green algae. Weeds drift below the surface of the water and tangle up fishing lines and boat motors.

Wearmouth has had a cottage at Pine Lake, 40 kilometres southeast of Red Deer, for 17 years. He says the problems started 10 years ago and seem to be getting worse.

Wearmouth chairs a local action group trying to clean up the lake. He says studies by Alberta Environmental Protection show "phosphorus and nitrates are running into the lake. And in the spring, during runoff, it's just like flushing a huge toilet."

The excess plant nutrients could come from a variety of sources. One hundred and twenty cottages line the lakeshore. Five private campgrounds contain more than 800 campsites. On a busy weekend, as many as 5,000 people use the narrow, four-square-kilometre lake to boat, fish and camp.

But biologists who have studied Pine Lake blame a lot of its problems on agriculture. Dave Trew with Alberta Environmental Protection has sampled creeks that drain the farmland surrounding Pine Lake.

"During spring runoff, phosphorous levels immediately upstream of livestock-feeding areas on some small farms were very low. Measurements taken immediately downstream of livestock-feeding areas were very high. While studies are ongoing, it is obvious agriculture plays a major role in nutrient loading of lakes."

Neil MacAlpine agrees. He is a water management engineer with Alberta Agriculture, Food and Rural Development. "Pine Lake tells us we can't stand back and say agriculture has no effect on water quality. We're clearly finding those winter livestock feeding areas are an issue."

> **"Information regarding agricultural impacts on surface and groundwater in Alberta is totally inadequate."**

"Nitrogen contamination from intensive livestock operations likely poses the most serious threat to water in Alberta." Alberta has an estimated 4,800 cattle feedlots. A big feedlot can produce as much waste as a city of 200,000 people.

The impact of agriculture on water quality is hard to pin down. We know that what farmers put on the land eventually ends up in our water supply, but we don't know how much or how often. A farm isn't a pulp mill with a single, measurable source of effluents.

According to Brent Paterson, who heads up a new federal-provincial study on farming and water quality, "Information regarding agricultural impacts on surface and groundwater in Alberta is totally inadequate and a significant increase in monitoring and research is required."

The Meat of the Matter

Paterson's study is part of the Canada-Alberta Environmentally Sustainable Agriculture project (CAESA), started in 1992. Among other issues, the project flags water quality as an emerging problem in need of attention.

Paterson says in parts of eastern Canada and the U.S., water pollution from agriculture has become a serious problem. Toxic chemicals contaminate wells from which people used to drink. He notes that "Alberta and the other prairie provinces have not been considered as high risk because of relatively low precipitation and less intensive agriculture. However, there are concerns.

"Nitrogen contamination from intensive livestock operations likely poses the most serious threat to water in Alberta," Paterson says.

Alberta has an estimated 4,800 cattle feedlots and some have 20,000 or more cattle. Ranchers say one cow produces as much waste as 10 people. So a big feedlot can produce as much waste as a city of 200,000 people.

"That's a lot of manure on not much land," states Paterson.

But, he notes, a 1991 study by the Alberta Environmental Centre found that while "minor to moderate water problems exist at some feedlots, the adverse effects were generally short-lived." The study found that bacteria counts soared wildly during spring runoff and after rainstorms, but quickly returned to normal. It did, however, recommend against swimming immediately downstream of feedlots.

Feedlot operators usually dispose of their manure by spreading it on nearby fields. According to existing 1982 guidelines, one hectare of irrigated land, or two hectares of dry land, can handle the manure from 30 cattle. Paterson says those guidelines may need to be revised downward and feedlot operators will have to look for additional lands to dispose of manure.

Last summer, Neil MacAlpine published a survey of studies on the impacts of agriculture on water quality in Alberta. The literature supports the no-need-to-panic point of view.

He says "the extent and severity of agricultural pollution of water...appears neither severe nor widespread. None of these studies has yet found serious health hazards to Albertans."

But, he says, they may say something about the way Edmonton's water tastes in the spring. For years, Edmontonians have complained about coloured, smelly drinking water during the thaw. The city's drinking water comes from the North Saskatchewan River and the usual explanation involves rotting leaves and natural organic breakdowns.

MacAlpine, however, cites a 1992 study by the city of several creeks upstream of Edmonton that flow into the North Saskatchewan. Researchers compared the timing of peak flows from the creeks, all of them in the agricultural area between Edmonton and Drayton Valley, to the timing of peaks in the colour of raw water entering the city's treatment plants.

"We are very fortunate in Alberta. Our levels of chemical use are way below most other agricultural areas."

They found an excellent correlation between peak flows from spring and summer runoff and problems with Edmonton's water. The same correlation did not exist with streams upriver of Drayton Valley in forested watersheds.

The data appear to link runoff problems with livestock wastes. The culprit may be livestock wintering and feeding areas too close to the creeks below Drayton Valley.

A Few More Additives

Paterson says we need to study the effects of nitrates from fertilizers on water quality. He was surprised when the CAESA water study turned up nitrates below the root zone in some farm fields. That means the chemicals had seeped closer to the water table than researchers had thought they would. So far, the groundwater still tests clean, as long as farmers stick to recommended application rates for fertilizers.

Pesticides pose another potential problem. Alberta Environmental Protection started a pesticide monitoring program in 1986 and has collected more that 300 water samples in southern Alberta. The samples contained very low, but detectable, levels of pesticides. The levels did not exceed Health and Welfare Canada standards.

Wayne Lindwall runs the land resources science section at the Agriculture and Agri-Food Canada Research Station in Lethbridge. He also sits on the water quality committee of CAESA. He says we don't have a problem now, but we need more research on the long-term effects of pesticides. "We have some of the cleanest, safest food and water in the world and we want to keep it that way.

"We are very fortunate in Alberta. Our levels of chemical use are way below most other agricultural areas." He adds that more farmers may move away from chemicals. They have started to show interest in biological alternatives. In the United States, for example, biopesticide sales top $1 billion annually and show an increase of 30 per cent a year. Chemical sales, by contrast, are flat.

Toward 1900 by 2000

Bill Wearmouth would like to restore Pine Lake to its pristine turn-of-the-century condition over the next five to 10 years. He and other members of the non-profit Pine Lake Reclamation Society know this will take money and the goodwill of many lake users, including farmers. "We're all in this together and the time has come for action," says Wearmouth.

Three local farmers sit on the society's six-member executive. Wearmouth says the society will encourage phosphorous-seeping farms to clean up. What's more, it will help with the costs. It has started to sell memberships and plans an August fundraiser called Clean Lake Day.

Controlling agricultural runoff can cost a lot of money. For example, feedlot operators may need catchment ponds to properly manage the rate and concentration of nutrient loading into adjacent streams. Some feedlots may simply have to move farther away from rivers and lakes.

Small ranchers may have to move or redesign wintering sites to keep livestock away from waterbodies.

If the measures cost too much, farmers may not act on them voluntarily.

Agriculture Exempt?

In 1993, the provincial government passed the Environmental Protection and Enhancement Act (EPEA), an omnibus of environmental law. The act does not directly regulate agricultural operations.

Ron Hicks, a spokesman for Alberta Environmental Protection, says farmers will be self-regulating under a farm practices board set up through Alberta Agriculture, Food and Rural Development.

EPEA does contain some discretionary regulation of agriculture. Some large, intensive agricultural operations, such as feedlots, may in future need approval from Alberta Environmental Protection.

Also, since the act prohibits the release of substances with serious environmental impacts, it could become a tool to require the cleanup of farm-polluted streams.

Finally, says Hicks, the act allows the minister of environmental protection to set environmental quality objectives. If a river or lake affected by agricultural runoff came under such an objective, farmers would have to work toward it.

Alf Cryderman is a freelance writer from Edmonton.

David Bates and Lynn Zwicky

Brave New Food

Coming soon to a grocery store near you.

DARYL BENSON

Field of canola near Delburne.

Your first taste of agricultural biotechnology may be a tomato—a sweet, firm, red one. You could already buy it if you lived in the United States. Calgene Inc. of California started marketing its registered Flavr Savr tomato last February.

The Flavr Savr has designer DNA. Genetic engineers removed the gene that causes ripening and reinserted it "backward." The result: a tomato that ripens slowly. Producers have to harvest conventional tomatoes green so they won't go to mush before they get to the store. The Flavr Savr, however, stays firm in transit even though it is picked red. Since it stays on the vine longer, marketers say it tastes better.

You may see other biotech foods soon: oil from canola designed to withstand herbicides and milk from cows injected with a genetically engineered hormone that increases lactation.

When you buy these products, you'll buy more than food: you'll buy the whole food system that goes with them. Agricultural biotechnology will change farming. It promises to reduce dependence on fertilizers and pesticides and to boost productivity. On the down side, we don't understand all of its ecological consequences.

Nettie Wiebe, a farmer from Delisle, Saskatchewan and past president of the National Farmers Union, speaks across Canada about food production, sustainable agriculture and

"We have a technological arrogance about nature that is quite dangerous. We understand pathetically little about nature's intricate balances."

community. She says 30 years ago farm chemicals, like biotechnology today, promised a green revolution.

"There was a great deal of enthusiasm at first but as we see more and more of the overall effects, there's a great deal more anxiety and caution about the use of farm chemicals.

"I believe we should err on the side of caution in some of these areas because the consequences are unknown," she says. "It's not a question of stopping it. But who controls it and for what purpose are very important questions."

Wilf Keller, a research officer with the National Research Council's Plant Biotechnology Institute in Saskatoon, says we need to keep the risks of biotechnology in perspective. He says when you get in your car, you might get killed in an accident. "There are millions of cars on the roads, however, because they are a superior means of transportation to the horse-drawn carriage."

Seeds of Change

You can sometimes smell a field of canola, the heavy honey-sweet fragrance, before you glimpse the blinding sea of yellow blossoms. Canola is a staple of Alberta agriculture. In 1993, it accounted for 16 per cent of Alberta's seeded cropland. Out of 90 field trials of genetically altered crops in the province last year, 83 were devoted to designer canola.

Bill Riley, research co-ordinator with the Winnipeg-based Canola Council of Canada, says field trials could produce canola tolerant to herbicides, insects and diseases.

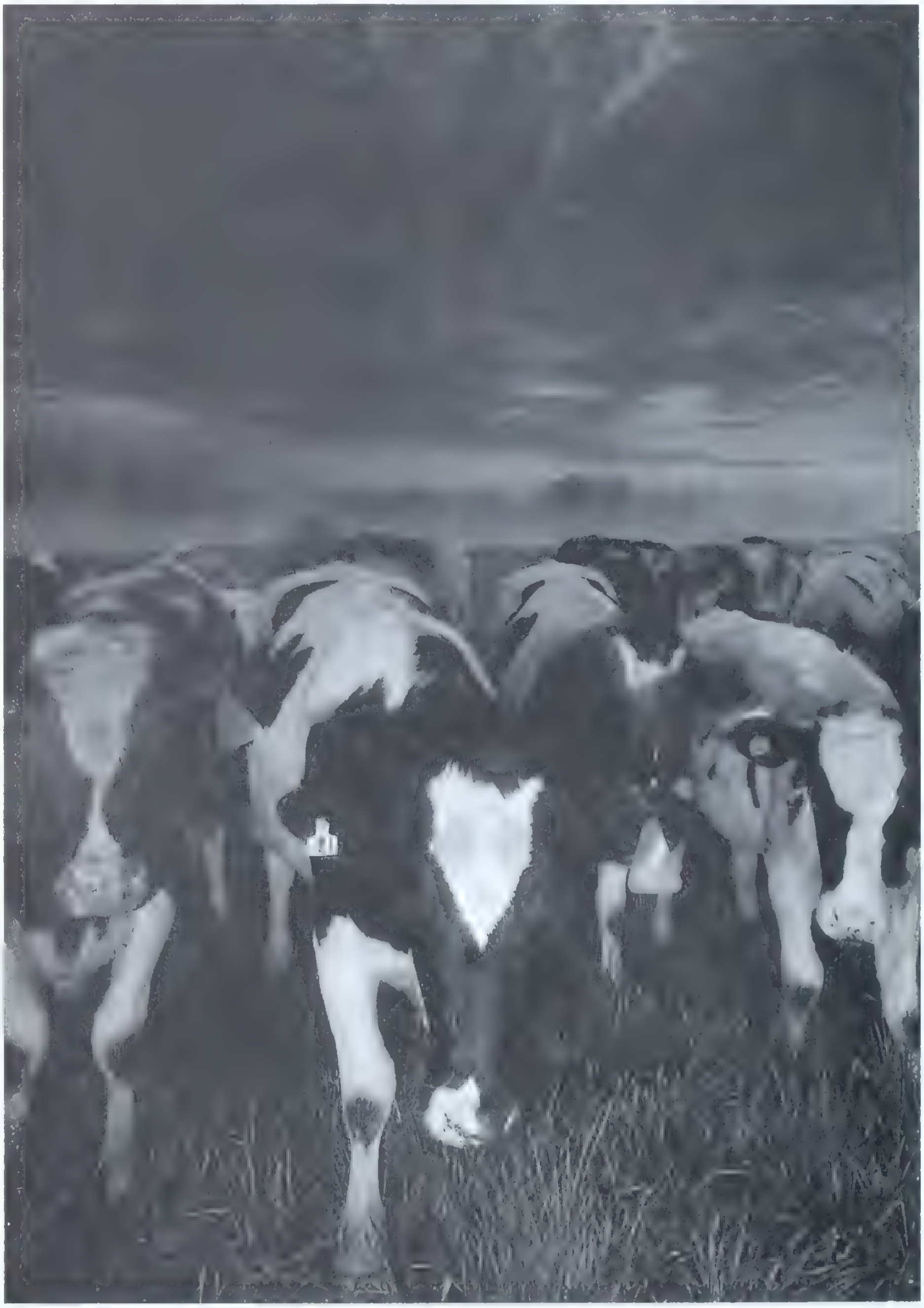
Farmers may need genetically installed resistance to insects if environmental concerns lead to the deregistration of some pesticides, he says. U.S. agencies are already reviewing the registration of an insecticide now approved for many crops, including canola.

Herbicide-tolerant canola may win the race to commercialization, says Wilf Keller. To produce herbicide-resistant canola, genetic engineers isolate genes from fungi, bacteria or viruses and add them to canola DNA. Researchers can also create a new canola gene through mutation.

The genetically altered canola survives applications of non-selective herbicides designed to kill everything else green. Farmers who practice zero- or no-till farming—a technique that cuts soil erosion and replenishes organic matter—rely on herbicides such as Roundup to control weeds.

"The active ingredient of Roundup is relatively environmentally friendly," says Keller. "It breaks down quickly in the soil, has no mammalian or animal toxicity and kills only plants. I think herbicide-tolerant canola is a positive step because it can reduce chemical inputs and take producers to a much more environmentally friendly system."

It may also more firmly entrench herbicides in farming practice. The same companies that market herbicides have invested heavily in research on herbicide-resistant canola. Monsanto makes Roundup and



Holsteins near Edmonton.

DARYL BENSON

"The more we try to educate the public directly, the more confusion we see in the minds of consumers who wonder, what are we trying to hide? We're not trying to hide anything. The milk is the same. We're not adding anything to the milk."

conducted 18 of Alberta's field trials for herbicide-resistant canola in 1993. AgrEvo, a subsidiary of Hoechst Noram, another farm chemical company, did 31 trials.

Nettie Wiebe says the chemical companies make no bones about the connection between the herbicides they market and the plants designed to survive them. "It's a vested interest here. It's not an open-ended scientific search for truth and knowledge. It's never been in the mandate of corporations to pursue the public good. Whose interests are being served?

"If herbicide-resistant canola pushes average production up, farmers will have to use it to stay competitive. It reduces us to one choice.

"I am very worried about the private nature of biotechnology. All of us share one ecological system, and the idea that a few who have the technical and financial means to do this kind of research will control it and have property rights over such basic things as life forms, is a very frightening thought."

Wiebe also worries about environmental impacts. "We have a technological arrogance about nature that is quite dangerous. We understand pathetically little about nature's intricate balances. It's a tremendously complex system."

For example, says Wiebe, the introduction of plants with a "one-dimensional" purpose could disrupt delicate environmental balances in unforeseen ways. What if genetically altered plants are so successful they out-compete native plants and invade natural areas? What if biotechnology brings on changes faster than other species can adapt to them?

"We understand the specifics," she says, "but not enough about how interwoven these balances are."

The Milk of Human Ingenuity

Bovine somatotropin (BST), a naturally occurring hormone, boosts milk production in cows. In the 1980s, genetic engineers discovered a way to manufacture it synthetically. Experiments showed that cows injected with synthetic BST produced more milk and required little or no extra maintenance. Dairy farmers such as John Bocock were enthusiastic, at first.

"My initial thoughts were that if I could produce 20 per cent more milk with virtually no disadvantages, of course, that sounded very exciting," says the St. Albert dairy farmer. "But the more I learned about BST, the more concerned I got."

Bocock's concerns focus on two issues: herd health and consumer reaction. Based on University of Alberta research, Bocock is convinced administering BST to dairy cows will shorten their productive lifetime. As it is, many never reach "middle age," often a dairy cow's most productive period.

"The challenge dairy farmers face is to keep cows in their herds longer," Bocock says. "If BST knocks them out of the herd earlier, then it's only working against itself. We've been selecting for cows that give more milk, and that's selecting for cows that produce more BST themselves. I think we've selected to the point where the average cow has as much BST as she can handle."

Monsanto Canada Inc. is one of several firms hoping to market synthetic BST when and if Canada's bureau of veterinary drugs issues the necessary registration. The U.S. Food and Drug Administration issued its registration for BST last November and the product went commercial in the U.S. in February.

David Nattress, director of Monsanto's animal science division, says BST-treated cows do not retire unusually early and that the University of Alberta research findings are not typical of overall results.

Bocock also worries that consumer reaction to BST poses a big threat to dairy farms.

"We are already having enough trouble in this day and age convincing consumers that milk is a healthy food," he says. "They have already indicated their concerns about BST in milk because when they found out that milk from BST-treated cows in research herds was getting into the public milk supply (which happened in B.C. in the late 1980s), there was a rather sharp drop in consumption," he says.

Nattress says several Canadian and international health organizations have determined that milk from cows receiving BST poses no health risks to humans. Monsanto produces BST with the same technology that makes synthetic human insulin, he says. Genetic engineers use enzymes to snip from a chromosome the gene that controls BST production in a cow's pituitary gland. They transplant it into bacteria, where it grows, and later collect and purify it.

BST occurs naturally in milk, Nattress notes. If BST gets registration in Canada, he says BST levels in milk will not change nor pose any threat to humans. "Protein-growth hormones are species-specific," he says. "BST, for example, is not active in humans. You can eat BST. You can inject it into people. It will have no activity whatsoever."

But, says Nattress, "The more we try to educate the public directly, the more confusion we see in the minds of consumers who wonder, what are we trying to hide? We're not trying to hide anything. The milk is the same. We're not adding anything to the milk."

Frankenfood?

Porter Noveilli, the public relations firm handling the Flavr Savr, says its market surveys show 75 per cent of consumers will buy Calgene's genetically altered tomato. That leaves 25 per cent of us feeling a little squeamish.

Medical biotechnology inspires wonder, but agricultural biotechnology often inspires suspicion. Ironically, both rely on the same technology.

Bob Church, professor emeritus of medical biotechnology at the University of Calgary and a director of Alta Genetic Inc., says people see medical and agricultural biotechnology differently because they see doctors more often than they see farmers.

"When my grandfather took eggs, cheese, milk or beef to market, he saw his customers every week," he says. "Today, farmers wave good-bye to their products when the cattle liner leaves the yard. At the other end, consumers think milk comes from Safeway."

David Bates is a freelance writer in Calgary. Lynn Zwicky edits Environment Views.

Lee Hart

Swallow Hard

Should you worry about the chemical side order that comes with your food?

The ingredients in a dollop of artificial whipping cream can make you cringe. The food label has a long list of mysteriously named additives such as acetylated monoglycerides, methylcellulose, propylene glycol, phenylalanine tartrazine and maltol.

So, skip dessert—who needs the calories anyway—and stick to some good plain food: a lean Alberta-beef steak sandwich with a baked potato and a salad. That sounds like a healthy enough meal.

But have trace elements of the growth hormone fed to this central Alberta steer crept into the meat? Maybe a fraction of warble and lice insecticide, trickled along the steer's spine several months before slaughter, got absorbed in the muscle tissue.

Maybe herbicides such as declofop-methyl, effective for wild-oat control, linger in the bread made from prairie-grown wheat. The billowy potato, from southern Alberta, could retain a tinge of the ripening agent diquat. The lettuce and tomato don't even come from here; could they be laced with insecticides that aren't even registered in this country?

That's the hazard of wondering whether Canadians have a safe food supply. Depending on whom you trust, it could be a long time before you enjoy another meal.

The Combo

Fact and fiction get mixed up in the emotion-laden issue of food safety. The average person should at least try to stay informed, suggests Calgary physician David Swann. He basically trusts Canada's food regulatory system, but questions whether researchers have adequately assessed the long-term effects of combinations of pesticide residues and food additives.

Swann volunteers with a national organization called the Healthy Cities Movement. The movement promotes better quality of life for urban residents through prevention of health, environmental and social problems.

Swann worries that technology moves faster than understanding.

"People ask how much we know about all this, and whether we are controlling the addition of substances to food at a level that is reasonable in terms of health and safety," says Swann. "And the most honest answer is we just don't know."

Swann does not point to health threats from particular food preservatives or pesticide residues. He worries more about the combination of minute, and in isolation acceptable, levels of contaminants in a range of foods consumed over an extended period.

"In the name of greater productivity, we are exposing ourselves to cumulative doses of interactive substances we don't understand," says Swann. He credits federal food safety regulators with doing a good job of monitoring food safety "within the existing level of knowledge.

"Like the rest of Canada, however, I want to know more than we know at present," says Swann. "I'm convinced about the effects of long-term low-level exposure to pesticides and food additives on reproductive health and children. We need to keep the use of substances to a minimum in both the number and variety so we have at least some sense of control."

But with up to 1,000 new chemicals created annually and more than 24,000 registered pesticides around the world, Swann doesn't see this happening. "Right now, we don't know what we are measuring because there are so many variables," he says.

Logan Stanfield, medical director of the recently opened Environmental Medical Centre in Calgary, is less patient with the whole system than David Swann.

"I don't buy the argument that chemical residues in food are safe at all."

He says the average body can't cope with the load of adulteration typical to our food supply. Stanfield points to research estimating that the average person consumes 4.5 kilograms of synthetic, or xenobiotic, additives each year—for example colourings, stabilizers, emulsifiers and preservatives.

The body can detoxify a certain amount of contaminants, Stanfield explains, and it often relies on food for substances that aid the detox process. Too often, however, additives destroy those substances. "So here we have food with contaminants that is devoid of the very ingredients the body needs to handle the toxins," he says.

In addition to additives deliberately added to food, the body must detoxify residues of agricultural chemicals such as herbicides, insecticides and ripening agents.

"We get a tremendous load of substances that the body can't detoxify," says Stanfield. "I'm concerned about the cumulative effect of low-level substances that reach the safety threshold." This loading, he believes, results in both physical and mental illness.

Spicy Entrees

Plant geneticist Joseph Cummins levels even more scorching criticism at Canadian and international food safety regulators. He has earned headlines, and a reputation for controversy, with his opinion that regulators, food processors and chemical manufacturers put profits before health and set unsafe standards for chemical residues on food.

Cummins is an associate professor at the University of Western Ontario. He says his own and others' research condemns chemical residues on food. "Pesticides on food kill about 6,000 United States citizens each year (about 600 deaths in Canada)," he writes.

As he thumbs through *Everything Added to Food*, a publication of the U.S. Food and Drug Administration, Cummins can hardly believe his eyes.

He finds an entry for acrolein, a toxic World War I gas; another entry for acrylamide, a chemical known to cause sterility in men and birth defects; another for ethylene oxide, known to cause cancer, birth defects and emotional instability that can lead to insanity.

"There are many others, but these are some of the main ones," he says. "How can anyone allow these to be used in foods? Why are they used? There is no answer in this book."

Cummins is particularly concerned about the quality of international food safety regulation, especially about the Codex Alimentarius, a commission of the United Nations that makes recommendations on chemical residues limits for food products traded among countries.

"In the name of greater productivity, we are exposing ourselves to cumulative doses of interactive substances we don't understand. "

Cummins believes new regional and international trading agreements, such as the North American Free Trade Agreement (NAFTA) and the General Agreement on Tariffs and Trade (GATT), will pressure countries such as Canada to accept imports with higher residue limits than is now allowed. The Codex Alimentarius commission, he says, will only reinforce the trend.

Cummins says under the current Codex board "all groups in Canada and the United States concerned about natural foods are totally eliminated.

"This is a very stark, very frightening look into the future. Our lives will be dominated by multinational concerns."

Many people worry about food safety and the environment, Cummins says, but few know about the Codex Alimentarius and its implications.

Standard Fare

Canadian food safety regulators are emphatic that our food supply is safe.

All divisions of Health and Welfare Canada—the department responsible for setting standards for pesticide, food additive and antibiotic residue levels—say the margin of safety built around registered chemicals provides protection for every age range and consumer pattern in the country.

"If there was even just a suspicion that a given residue level would be hazardous to human health, that product wouldn't receive registration," says Chris Warfield, head of the agriculture chemical evaluation division with Health and Welfare Canada.

"And, on the other hand, if it was thought that a product now registered adversely affected human health, it would be off the market really fast. Neither the government nor the chemical manufacturer would tolerate that situation."

Every chemical—whether a pesticide, food additive or veterinary drug—goes through the same registration process and uses similar criteria to establish safe limits.

First, toxicologists establish the level of chemical residue that produces no adverse effect in lab animals. They take that no-effect level and divide it by 100 or 1,000 to come up with the "acceptable daily intake" (ADI).

"That's a level that toxicologists tell us would produce no ill effects in humans, even if you consumed a food with that level of residue every day for 80 years," says Warfield.

Regulators also make rules about the timing of some chemical applications. For example, farmers must suspend pesticide applications a certain number of days before harvest; they can't use some veterinary products a certain number of days before slaughter.

As a further safeguard, Health and Welfare calculates the "potential daily intake" (PDI) for each chemical. The PDI exaggerates what the average Canadian would actually consume: it assumes a maximum intake of food with maximum allowable residue levels. The PDI has to come out lower than the ADI for the chemical receive registration.

Regulators monitor domestic and imported foods to ensure they fall within Canadian guidelines. Agriculture Canada, which does the bulk of the monitoring, and Health and Welfare test thousands of food samples every year.

It's impossible to check chemical residues in every bushel of wheat, sack of potatoes and side of beef grown in Canada, or every truckload of produce that crosses the border, but inspectors are confident few residue violations get through the system.

Bert Lukey, a food chemistry specialist with Health and Welfare Canada in Vancouver, says the system checks random samples and tests crops in regions where the use of pesticides may be higher than normal.

"To begin with, in today's economy farmers aren't going to be wasting money by applying more pesticides than they need," he says. Health and Welfare has built a national and international intelligence network, which alerts inspectors to suspicious producers, to areas where insect outbreaks may have led to an unusually high dose of pesticides and to shipments where residue levels could be out of line with Canadian standards.

Will the Codex Alimentarius pressure Canada to accept higher residues on products? No, say Health and Welfare officials. They acknowledge the attempt to harmonize international trade standards, but deny that it puts safety at risk. They say any change in standards on residues limits, either higher or lower, will have to demonstrate no health risks based on proper research.

"I vehemently believe Canada has the safest food supply in the world," says Len Ritter, executive director of the Canadian Network of Toxicology Centres. The centre, based at the University of Guelph, aims to foster excellence in toxicology research and education.

Ritter admits Canadian standards for residues cannot guarantee zero adverse effects on Canadians, but the risk is almost immeasurable. Product testing and standards provide a big margin of safety.

Are all combinations of acceptable chemical residues thoroughly tested to ensure no health hazard? Ritter says it's good in theory, but impossible to do.

"How could you test every possible combination of chemicals that a population might encounter? But that doesn't mean people are at risk. I believe we have enough knowledge about chemical structure and function to make a good prediction of where reaction to certain combinations might be negative."

These reassurances still don't resolve the doubts of David Swann. "We need to rethink the process and question how beneficial these chemicals are," he says. "We may need to make some sacrifices as we walk a fine line between economic development and protection of our environmental health."

Swann agrees with Logan Stanfield and Joseph Cummins that the public needs to be more aware of chemical residues and more involved with decisions about how to regulate them.

Lee Hart is western field editor for Country Guide *magazine.*

Greener Thumbs

An organic community garden in Lethbridge will add a children's garden plot this year.

"What children do during that one summer will affect the rest of their lives in their attitude about growing things, food and the environment," says garden co-ordinator Kevin Masson.

Grow It!, the name of the community garden, began as a pilot project last year on land donated by the City of Lethbridge. With a grant from the Ecotrust Fund, the South Country Community Association administered the garden and rented plots of land for $10 to more than 40 green thumbs.

Masson says the project emphasizes education as much as food production. Grow It! offered monthly workshops on environmentally friendly gardening—for example, natural weed and pest control and passive irrigation.

Sprinklers lose a lot of water to evaporation. Some Grow It! gardeners tried watering with plastic milk jugs punctured with a few needle holes. They buried the jugs two-thirds deep in the soil and filled the jugs with water.

"The water comes out slowly at the root level and will water the garden for two to four days," says Masson.

The demonstration gardens, open to the public, display examples of companion planting to control pests, mulching, drought-tolerant plants and heritage wheat.

Only one gardener broke the Grow It! no-pesticides rule last year and that plot didn't do as well as most, says Masson. This year, gardeners will sign a formal no-pesticides contract and Grow It! will ban gardeners caught using pesticides.

The land for the garden, next to the city greenhouses, used to grow bedding plants for Lethbridge parks. Parks manager Ron Peterson says Lethbridge wants lower maintenance ground cover and needs less nursery space. The city has also given Grow It! space inside the greenhouses for an office and gardening library.

"We were very fortunate to have the co-operation of the city as well as the grant from Ecotrust to get the garden established until we could get enough volunteer labour to keep it going," says Masson. "We're aiming for a self-sustaining project."

Conservation Begins at Home

An association of four southern Alberta conservation groups has identified 14 local sites in need of protection.

"We call them priority areas," says Greg Yeoman, researcher for the South Country Protected Areas Association. "We felt we could really make a case for these areas because they have significant features that are not protected, or are under-protected, in Alberta."

The association—a coalition of the Coaldale Ecology Club, the Lethbridge Naturalists Society, the South Country Community Association and the Southern Alberta Environmental Group—began its inventory of local natural areas in June last year. Environment Canada's Environmental Partners Fund gave the project a matching grant tied to committed volunteer hours.

Drawing on the work of previous studies, project researchers found that less than one per cent, or 218 square kilometres, of the 30,720-square-kilometre study region had protection. The study region contains parts of four ecoregions and spans the municipal districts of Cardston, Pincher Creek, Taber, Willow Creek and a small part of Cypress.

"A 'protected area' has some type of legislated long-term designation," says Yeoman. Alberta has 19 mechanisms to legally set aside areas for protection, he says, ranging from ecological reserves to conservation easements. Yeoman says the association will aim for protected status for the 14 priority areas, which together make up five per cent of the study area. "Anything we do from now on will be toward that goal."

The association started the project to support the provincial Special Places 2000 program and the Endangered Spaces program of the World Wildlife Fund. Both Special Places and Endangered Spaces work for the systematic protection of a representative sample of Alberta's 19 ecoregions.

The association sees a need to work with private landowners to conserve natural areas. Private landowners control big sweeps of the natural landscapes that survive in southern Alberta.

Yeoman says the availability of legal mechanisms to protect land guarantees nothing. He says someone has to go out and contact the users of the land.

The association also sees public awareness as a crucial step toward adequate conservation.

"We did it so people will know these features are there," says Yeoman. "If in future, questions come up about the use of these areas, there will be some public support for the land."

The association has released a report on its work to date. Copies cost $5 from the Environmental Resource Centre, 535 - 13 Street North, Lethbridge T1H 2S6.

Big Plans for a Little Recycling

Recycling faces a big obstacle in northern Alberta: a dispersed population remote from potential markets. A new project—Northern Co-ordinated Action for Recycling Enterprises (CARE)—hopes to break that obstacle down.

CARE involves 37 municipalities across Alberta's north—60 per cent of the province by area and only 10 per cent by population.

Over the next three years, CARE will promote co-operation among municipalities and recycling groups to reduce transportation and equipment costs for recycling. It will also try to identify new market, transportation and financing opportunities for northern communities recycling in teams.

The Northern Alberta Development Council (NADC), Alberta Environmental Protection and northern municipalities fund CARE. NADC started the project because recycling groups and communities in the north wanted more information on markets and funding for recycling.

Big centres in northern Alberta, such as Grande Prairie and Peace River, have recycling programs in place, mostly for paper.

"There's a public willingness to recycle," says David Dittrick, a newly hired CARE co-ordinator working out of Peace River. He helps people find recycling programs they can use, instead of sending their waste to the landfill. "You have to become an information warehouse," he observes.

"But what we have to do," continues Dittrick, "is increase the political willingness to recycle." In tough financial times, municipalities regard recycling as an unnecessary expense. Dittrick says municipalities have to realize that waste management costs money too.

Helen Rice, CARE's board chairman and a city councillor in Grande Prairie says, "We've got to look at waste as an economic development generator rather than a horrendous cost to municipalities."

Rice says a recycling business in Grande Prairie shows the way. Recycle Plus has baled more than 450 tonnes of paper. It has six staff, provides work for 10 mentally handicapped people and reduces the amount of waste going to the landfill. "And it hasn't cost the municipality anything."

More regional recycling projects may soon surface in Alberta. A waste minimization committee in West Yellowhead—an area that includes Evansburg, Entwistle, Hinton, Jasper, Grande Cache and I.D. 14—has finished a plan and hopes to hire a coordinator.

Heard It Through the Grapevine

Terry White keeps his ear to the green grapevine. His company, Energy Concepts Inc. of Regina, designed the solar kiln that dries lumber at Solar Dry Timber Specialties in Rocky Mountain House.

White, general manager of ECI, was one of 100 eco-entrepreneurs who set up a ground-breaking network for small green business last October in Winnipeg. The network, called EarthEnterprise, links up businesses and investors across North America.

White says EarthEnterprise gives eco-friendly businesses advice and connections on how to make money.

"Believe me, that can be a struggle," he says. A green philosophy is fine, he observes, but if it doesn't make money, it won't support a business.

ECI has been in business for six years. Even in tight times, White says good marketing finds consumer dollars. He says people spend money on green products if they have the information to make the choice.

For White, EarthEnterprise is a "wonderful opportunity to meet like-minded people" who share the same philosophical bent, but ground it in "good practical business advice." Through the network, he has also made new contacts interested in ECI's products.

EarthEnterprise is a project of the International Institute for Sustainable Development (IISD) based in Winnipeg. Rob Kerr, project manager, says "we discovered a lot of small green businesses out there and we thought it would be wonderful if they succeeded and prospered."

As of December, EarthEnterprise listed 1,200 businesses in Canada and the U.S. on its network. Membership is free. The network puts out a newsletter four times a year. It has also published the EarthEnterprise Tool Kit, which gives the collected advice of eco-entrepreneurs and business consultants on financing and marketing for small green businesses.

Kerr says EarthEnterprise hopes to hold more networking meetings this year. For more information, contact the IISD, 6th Floor, Portage Avenue East, Winnipeg, Manitoba R3B 0Y4.

Cathie Bartlett is an Edmonton writer and researcher.

LETTERS

Bow Corridor
On the One Hand

The Fall 1993 edition of *Environment Views* suggests that there is a problem in the Bow Corridor because of "fragmented planning." Unfortunately, you do not cite even one example of this.

You suggest that the Municipal District of Bighorn, Town of Canmore and Banff National Park do not co-ordinate their planning activities or co-ordinate them poorly. Again, you provide no specific examples. We, however, can provide numerous examples of planning co-ordination that has been effective and efficient. For example, Parks Canada employees were invited to two special meetings on wildlife corridors during the review of the M.D. of Bighorn's general municipal plan in 1991 and 1992. Two Town of Canmore councillors sat on the steering committee that reviewed the plan.

Your suggestion that the corridor needs one planning jurisdiction ignores the fact that M.D. residents and ratepayers have different aspirations than residents of Canmore and Banff. This was a major factor in Canmore's annexation of corridor land in 1991. Canmore now controls virtually all the land proposed for tourism and resort development in the corridor. Since 1991, the M.D. has been able to focus on protecting important natural areas from such development or allowing it in a very few selected areas. We have also been able to focus on maintaining the viability of the mineral extraction and processing industry in the Bow Corridor, which is of major importance to the local and provincial economy.

Fritz Seidel
Reeve, M.D. of Bighorn

And On the Other

Thanks for a great feature on the Bow Corridor. Well done!

Bertram Dyck
Mayor, Town of Canmore

Sacred Ground
Conservation Christian

Since when did being an environmentalist and a "conservative Christian" become mutually exclusive? And since when does a person have to embrace an "earth-based spirituality" to live in a way that respects, protects and improves the environment? John Marsh, while accusing "conventional Christianity" of failing to recognize the wisdom in other traditions, spends an awful lot of time bashing traditional Christian values and beliefs in the name of environmentalism.

Rhonda Trenholm
Edmonton

Slap in the Face

I was extremely disappointed in the Winter 1993 issue of your magazine.

The feminist-New Age-pantheistic slant of the entire issue was an insult to every Christian in the true sense of the word. Your writers showed their complete incomprehension and blatantly bigoted views of the Christian faith.

If a Christian believes that his or her God created the earth, would they dare to deliberately desecrate that which was created, knowing that one day they will have to answer for their actions? Of course not. Western culture has committed many terrible environmental crimes, but please do not place the blame on the Christian faith.

Your magazine has slapped me in the face, despite my efforts to be a conscientious,

continued on page 24

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Letters continued…

environmentally sound citizen. Please drop my name from your mailing list.

Jim Verreault
Fox Creek

Fundamental Change

Thank you for allowing John Marsh and Stan Rowe to express their views regarding Christianity and our relationship to the earth.

As a former member of a fundamentalist church, I agree with both writers that the old-fashioned explanation of the Bible distorted man into a Baal who could take everything he wanted from this earth with God's permission.

And man has done so with a fury since the Industrial Revolution. Now we are stuck with the results.

When do we start to use our God-given I.Q.s to turn things around?

William Thysse
Thorhild

Unprecedented

Congratulations on the Winter 1993 edition, Sacred Ground. In an unprecedented move, I read the issue from cover to cover soon after I got it. I found the articles provided a powerful focus for my own personal thought regarding humans and our environment.

Douglas Johnson
Smithers, B.C.

Songs of the Earth

Your winter issue, Sacred Ground, truly pleased me. It made me think of my father, who replaced Sunday School classes for me and my brothers with drives, hikes and picnics in the woods and fields around Toronto. When we moved to B.C., my father became an amateur poet and sang praises to the mountains, forest and sea. He was of Welsh descent, with a strict Christian upbringing, and he attributed these miracles of nature to God.

The page five cartoon reflects my Welsh mother's religiosity: a three-layer universe of heaven, earth and hell. She would open the door of our pot-bellied kitchen heater to give us children a first-hand feel of the flames of hell. Small wonder her intelligent children rejected such theology.

Elenor Smith
Edmonton

Breaking Shells

I've read and re-read the articles in the winter issue of *Environment Views* and am delighted with it. I work with local residents on a land-use planning committee. We explore issues of tolerance, community and land ethics. Stan Rowe's article articulates many of the issues and feelings that we have grappled with in our group. I recommend Rowe's article for people trying to get beyond their shell of isolation and self-centredness.

Joan Sherman
Athabasca

Beyond Science

I commend you for the Winter 1993 issue of *Environment Views*. I particularly commend you for John Marsh's article. In a society that is so tied to dogma and physical buildings, it was refreshing to read Marsh.

I hope you will continue to seek out other material that explores environmental issues beyond hard-core science.

J. Cam Finlay
Sherwood Park

Open That Can

How wonderful to read your winter issue on sacred ground. The spiritual interpretation of nature is fundamental to our world view and to our concept of what is good environmental strategy. While many of us feel we are treading on new ground, you so aptly put us in context with St. Francis of Assisi's Canticle of the Sun. And so aptly depicted our spiritual thirst in the article "Blood Ties."

You have opened a tin of worms I am sure. I like the can-opener.

Dianne Hayley
Sherwood Park

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